TOBACCO

— FROM THE —

SEED-BED TO THE PACKING CASE

The result of three years' experience in Southern California.

—WITH—

Plain, Practical Directions

— FOR THE —

Grower on the Pacific Coast, Arizona and New Mexico.

From the pen of W. T. Sim, Etiwanda, Cal.

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TOBACCO

TOBACCO is a native of South America, and was introduced to the civilized world soon after the discovery of this continent. It is said that Columbus found it cultivated by the Indians in 1492. Its cultivation was commenced by the early settlers of Virginia, soon after the settlement of the colony.

It is recorded that in the year 1615, the gardens, fields, and even the streets of Jamestown, were planted with tobacco.

James I. of England, wrote a counter-blank on Tobacco, which was intended to do away with its use, and even the Popes have issued Edicts, excommunicating those who should use tobacco, while other great personages have violently opposed, and denounced its cultivation and use, but all the denunciation, and opposition has not hindered its rapid progress, and the extent of its cultivation, until at the present time, it is known to almost the whole world.

Tobacco, while a native of South America, is grown in many countries of the old world. Whether tobacco was known to any part of the old world before its discovery in America is in doubt, no authentic record is obtainable, that it had ever been cultivated prior to its discovery in America.

Tobacco has been so extensively cultivated, and for so long a time, that it has become naturalized wherever it has been introduced.

The modifications it undergoes in the different soils and climates, is quite marked, assuming characteristics peculiar to the locality in which it is produced. The amount of nicotine contained in tobaeco, varies greatly with the different varieties and modes of culture; that produced on heavily manured lands, as a general rule, containing a larger percentage than that grown on lands less heavily manured.

Thorough investigation, and the experiments made in this state, have convinced those who have given the subject their special attention, that this state is better fitted by climatic conditions, than any other part of the United States.

California, Arizona, and parts of New Mexico, as a field for tobacco raising, present possibilities that are very inviting, and that in a few years will be demonstrated, that a great and paying industry has been almost entirely overlooked; no great interest is being manifested at the present time, more especially in this state, in the culture of tobacco, many being desirous to engage in its culture, but not having the necessary experience, hesitate to embark in its cultivation without having the result of others' experience placed within their reach. Under these circumstances we have deemed it expedient to issue this book, giving the result of our own experiments, embodied in such a manner, in the general method of its culture, that we fully believe it cannot fail to be of considerable value to those thinking of engaging in its cultivation.

PEOPLE coming to this part of the state from the East, especially in the winter, after crossing hundreds of miles of desert, they suddenly find themselves in the midst of orchards and vineyards, are amazed at the change, and think they have entered into a new world, recollecting that a few days since they were pinched by the cold, and suffering the discomforts incident to an Eastern climate.

They can hardly realize the extraordinary change they have made, but as soon as they engage in horticultural or agricultural pursuits, they wonder why things don't do as they did in the Eastern locality, where they came from. They find that they are not capable of producing the same results, by the same means, they have been accustomed to; consequently by slow degrees, they commence to experiment under the new conditions, and in process of time, evolve new methods that are in harmony with their new environments.

Since coming to this state in 1891, we became interested in tobacco culture, and were led to investigate what had been done in the cultivation of the plant; we could hear of nothing but failure from anyone who had tried its cultivation. Old tobacco raisers, who had followed the business of growing tobacco for years, in the old tobacco states, had come to believe that its culture was not practicable, especially in this portion of the state—Southern California.

Being confident that the soil did not lack the necessary fertility, as everything else that was planted seemed to grow to perfection, we endeavored to find the cause of their failure, but inquiry brought forth only evasive responses from those from whom we sought to gain information.

Before deciding to experiment in a practicable way, we were anxious to get all the light on the subject possible. We therefore sought for anything that might be published applicable to Southern California, but found there was nothing that was in anyway satisfactory. All of the books published relating to the cultivation of tobacco were found to be disappointing, inasmuch, as they gave the systems in practice in the East, which we understood without their assistance. We finally came to the conclusion, that if we wanted to grow tobacco, we would have to do some pioneering in that line ourselves.

As there seems to be a belief, not confined to any particular locality, that tobacco raising, if it could be successfully accomplished, would be a

good thing for this part of the state; that, in fact, it would give us a new industry, with the prospect that it would equal, if not surpass the sugar-beet, and manufacture of sugar. The tobacco industry would be of benefit to the individual grower, simply for the reason, that it could not be controlled by large corporations, as the sugar-beet undoubtedly is; each grower could raise and dispose of his own crop, let it be large or small, without having to depend on large factories, for its market. It is not a crop that has necessarily to be hurried to the factory, but may be kept and sold at the convenience of the grower.

From the many communications received since placing in the Los Angeles Chamber of Commerce, a sample of this season's crop, asking information as to how it should be cared for, we are led to believe that many agriculturalists are very much interested in the proper method to raise such a staple crop, and that it only remains for the way to be pointed out, in a plain systematic manner, to induce a great many people to try its cultivation.

We do not propose in this connection to advise people to engage in the cultivation of tobacco to any great extent at the beginning. A failure, or a partial failure, might lead to disappointment, from which it would take a long time to recover. In tobacco growing, like many other productions, it requires time and experience, also persevering industry.

That we have the soil, and climate, there is no just grounds to doubt, at the same time, everyone who engages in the raising of tobacco, will not meet with success. Some for lack of care in the different stages of its development, and others from lack of taste for the work; but as soon as it is demonstrated that it is a crop that will pay, there will be no doubt the tobacco industry, like other similar industries, will soon enlarge to proportions, as it has in states like Virginia and Kentucky.

Without entering into any disquisition on the "moral" of the use, or abuse of tobacco, it being a mooted question, whether it actually does more harm than good. Very eminent physicians, and many great and good men, have found a solace and comfort, with immunity from disease, from its habitual use. In our own case, at least, after forty years of constant indulgence, we can say without fear of contradiction, that we have discerned no bad effects from its use, either mentally or physically; nevertheless, we do not wish to be understood as advocating or encouraging its

use by those who have not formed the habit; but are willing to leave it to each individual's own sense of what is necessary to his own case.

Confining our field of observation to our own immediate markets, we find that there are at least seventy-five per cent. of the male population of the United States, who are habitual users of the weed in some form, and the large majority of whom would willingly sacrifice one meal a day rather than be deprived of what has become to them an actual necessity.

When we term tobacco a staple article, it is with the distinct understanding of its immense production and use, the estimated yield at the present time, being something like five hundred million pounds per annum, which, at an average valuation of ten cents per pound for the different grades, would amount to the large sum of fifty million dollars per annum. And including what is imported from other countries, probably twenty million dollars more. These figures are quoted to show, in a measure, the immense possibilites of the industry, and the almost certain results that will accrue to those who will, in time, make a success of the raising of tobacco in this state.

The tobacco growers in the states that raise it for a staple crop, have many disadvantages to contend with, that California is nearly altogether exempt from. While California has conditions that will have to be attended to, that do not enter into the calculations of the tobacco planter in the East and South; the difference in the conditions will be clearly pointed out and explained as we go along, not as the result of abstract theories, but as the patient results of three years actual experience in this state, with the advantage of years of experience in growing and manufacturing in the old tobacco states.

While the elements of danger to crops in the old tobacco states are continuous from the time the plants are set out until they are in the curing house—such as thunder storms, hail and heavy rain storms—all of which are liable to produce failure or partial failure; and are certain, in some localities, to happen every year, such happenings making successful crops very uncertain. While it cannot be said that none of the elements of danger are common to this state, it can be said that they prevail to only a very limited extent during the time the crop is growing.

The season, from April to November, being almost without rain;

with no storms to be feared, there is almost nothing in the way to prevent the crop from maturing successfully.

The exemption of the tobacco crop from the elements of dangers from the various kinds of storms in this state is a consideration that enters largely into the value of the crop, not so much from a partial failure or destruction of the entire crop, but especially from their blighting effects upon the color and quality of the leaf; here, with nothing to interfere with its steady and constant growth, the leaves, at maturity, are even in texture; and, having been properly tended, are without the blemishes that so much tend to mar the quality of the tobacco raised in some parts of the old tobacco states.

In all the various types of the seed-leaf varieties, the form of the leaf and its freedom from blemishes has much to do respecting its value as a cigar wrapper; these varieties, and the Havana, being used mainly for this purpose. The leaf that is designed for fine-cut, chewing tobacco, or fillers, not being so important in respect to blemishes.

The kind of a leaf a person wishes to grow will have to be determined, to a great extent, by the nature of the soil and the different locations. Many are deterred from trying to grow tobacco because of their lack of knowledge of the right kind of soil, believing that only a certain kind of soil will produce this plant, not realizing that tobacco is pre-eminently a weed, and a native of America. We have never found a soil that failed to grow tobacco, and a leaf that could be used commercially; but here comes in the benefit of good judgment and care in the selection of extra favorable locations for the production of the finer grades which command the greatest values; nevertheless, most any kind of soil will be found to produce a quality that will pay.

In certain clays that are heavy and strong, it will be difficult at first to get the plants to live when transplanted from the seed bed; but after getting well started, or, in the common parlance getting a "stand," such soils will often produce the very best crops, the growth being strong, heavy, and of fine quality.

Our mesa lands, we are satisfied, will produce a quality of tobacco, after the necessary experience has been acquired, that will equal any tobacco grown in any part of the world.

In a recent report from a committee of the California Board of Trade, they say that those best advised on the subject claim that California has within her borders one millon acres of land suitable for the cultivation of the higher grades of tobacco, while there is no doubt there are millons of acres more that are suitable for grades that will pay nearly as well. When this area shall be utilized in growing tobacco, as, in time it may be, the output of this state will aggregate more than the present total output of the United States.

From such an industry, on such a scale, the advantages that would accrue to this state are difficult to contemplate. Manufactories would arise, to work up the raw material, in all centers of trade and population; and the laborers required in these factories would be legion. The railroads and other carriers would find increased business in freighting out of the state many tons of tobacco products, where they are now carrying one ton. The farmers would receive a benefit that cannot be easily estimated.

It is well known that choice tobacco land in the eastern and southern states rent readily for fifty dollars, or more, per acre per annum; and what is true of the East in regard to the value of land for the production of this staple, would be more than true in regard to the same item in California. The increase in the value of the California farm products would add to the value of that farm, and result in a corresponding increase to the assessment roll.

The increased number of factories in cities and towns would give an impetus to all lines of business, and greatly advance the value of all city and town property. San Francisco and Los Angeles, would become the rivals of New York as cigar manufacturing centers, and their output of plug and smoking tobacco would surpass that of Richmond and St. Louis in these goods.

Tobacco has become one of the leading products in many parts of the country. While it is cultivated to a greater or less extent in nearly all sections, fifteen states produce more than ninety-nine per cent. of the tobacco of the United States. Some states are steadily increasing their production while other states one retrograding. As time goes on, the greater adaptability of one State, over others, to produce a superior article, gives it finally, control of the market.

The soil and climate of California is almost entirely different from the eastern sections of the United States. Our experiments in horticulture lead us to believe that we have a soil that with our superior climate, will produce a tobacco, which will be altogether different from that grown in the eastern and southern states, even should we use the same varieties that are grown there.

VARIETIES

There are numerous varieties and sub-varieties of tobacco; the latter of which have been produced principally by the differences in soil, climate and cultivation. The varieties most cultivated in the United States, are the Connecticut seed-leaf, Havana and Virgina. The Connecticut seed-leaf is considered best adapted to the northern sections; that, with its varieties. being grown most extensively there, although the Havana and other varieties are cultivated to a certain extent; it is also well suited to the middle states. It is usually known in the different northern states under some local name, which has given rise to so many types of the seed-leaf varieties.

The kinds most generally preferred in the southern states, are the Havana and Virginia, although a number of other varieties are also grown. In all the various types of the seed-leaf varieties, the form of the leaf has much to do respecting its value as a cigar wrapper, the Havana, being used mainly for this purpose. The leaf that is designed for fine-cut, chewing tobacco, and fillers, may be either, broad or narrow, long or short, the form of the leaf, making no difference with regard to its use. Formerly the broadest leaves were preferred by most buyers for cigar wrappers; but recently the long narrow leaf has come to be used by many, the preference being almost equally divided between the two; the latter being thought to cut more wrappers to the leaf and case, and yield more leaves per plant than the broad, while the former usually gives a somewhat heavier product per acre. The texture of the two varieties is about the same; the broad spreading leaves are very brittle, and are apt to be easily broken in working among them. Whether the broad or narrow leaf be cultivated, there will be quite a

distinction between the same varieties grown in different localities.

The nature of the soil, method of culture, etc., makes a great difference in the quality, and texture of the leaf. It would be well in commencing to grow tobacco in different localities, to try several of the varieties observing carefully their growth, when, by hybridizing, better cultivation, together with a perfect adaptation of soil, new varieties may be produced, and the old kinds improved, forming new types, the same as with all other plants. There is no crop that has a wider diversity of quality than tobacco, and none that will respond more quickly to extra skill, labor and management in its cultivation.

As in others kinds of farming, the culture of tobacco will vary in different localities, and every cultivator must modify the hints here given, to suit his own particular soil and location. Especially is this the condition in California. Take most any location in this end of the state, and we will find, that the nature of the soil, even on adjoining ranches, is almost entirely different in its elements, the very climate having different conditions of temperature on opposite sides of an avenue. The principle thing is to understand the nature of the plant, that is, the necessary requirements of the soil, climate, and culture, and the variety that is found best adapted to the particular locality.

As has been remarked before, tobacco will grow in almost any soil that is fit to grow anything else; the variety that best suits the locality is the kind to grow, and that can only be learned by experiment.

SOIL

Tobacco is an exhausting crop, and for the best results, requires a rich, warm, soil. In fact there is no plant, that is so largely influenced, by the character of the soil as tobacco. A deep, mellow, soil will always secure the best results, one that is naturally rich, or made so, by the application of the proper kind of fertilizers. A light loamy, sand, is one of the very best adapted to it; alluvial lands that are well drained and fertile are also good. It will not thrive on soil containing a surplus of water, however rich or whatever their character, and such lands should never be devoted to this crop, until they have been thoroughly underdrained. Soils containing a large amount of potash and lime, either naturally or by application, are the best suited to it. It will not thrive upon such lands, as are demominated "sour," unless the quality be first remedied by the application of salt, or lime, and previous cultivation. On such lands it will generally attain about one-fourth of its growth and then seem to remain stationery for a time the leaves assuming meanwhile a yellowish tinge. The crop, in such cases, will prove almost worthless —what there is of it—the stalks being hard and the quality of the leaf poor.

If the land is fresh and of good quality, manure will not be necessary although tobacco is a gross feeder and grows rapidly when once started; therefore it requires plenty of food to make it grow well. There is nothing better, that we know of, than well rotted barn yard manure. Any green crop plowed under is also good, adding humus to the soil, but may be the cause of bringing more worms. Excellent results have been attained an old alfalfa land, that has been well pastured; such is calculated to make strong tobacco. Our ordinary mesa land will be found to produce a fine quality of tobacco of light weight and fine texture; the more fertilizer being used the heavier the product.

SEED-BED

As strong, healthy, plants are essential for a good crop of tobacco, and in order that such plants may be obtained, it is well to prepare the Seed-bed properly. The locality of the bed should be in a protected place. In sections where the north winds come with frequency, it is necessary that the Seed-bed should have the best of protection, as the plant is so soon drawn from the ground.

After a thorough burning of brush, to help kill the vitality of weed seeds, the bed, or beds, should be dug, without turning over; what ashes may be left after burning will get mixed with the soil in raking over. Any kind of manure is good for the Seed-bed, that is well-rotted, and can be mixed thoroughly with the soil, reducing the surface to as fine a tilth as possible; no stones or lumps should be left on the surface, nor should the ground be too wet or too dry when the seed is sown.

SOWING

The time of sowing tobacco will vary in different localities, but we think about the same time will do for any of the valleys in Southern California. From our experience we would prefer February as being the best month to "sow." As the seed is slow to germinate, at least half the life of the tobacco being in the Seed-bed, it is well to sow early; the ground being more likely to keep moist than if sown later on. As an abundance of plants is what is wanted, it is a good plan to make, say three beds, and sow one each the three first weeks of the month. One ounce of seed will sow enough for an acre, or a bed space of twenty-five feet square.

The following preparation for a hot bed we have found to answer the purpose perfectly: Select the ground for the desired bed, say sixteen

feet square with a path through the centre about two feet wide, and dig the bed two feet deep, removing the soil to sides and ends of bed. As a foundation, put in about six inches of leaves, and tramp as solid as possible; then on top of leaves, fill in with about twelve inches of fresh barnyard manure, which ought to be well packed; then give it all the water it will take up; then cover with about three inches of fine soil which rake smooth, removing all stones and lumps; after getting in fine tilth, cover with boards and let it remain for eight or ten days to allow it to ferment and the rank heat to pass off. At the end of the time specified, remove the boards and rake the soil again, which will kill any weeds that may have germinated. The bed is now in condition to be sown. One tablespoonful of seed will be ample to sow the bed. Sow the seed evenly, on the surface, and press by walking on a board. Place boards around the beds, with edges up three inches above the surface, and bank the soil taken from the bed against the outside of these boards; the boards are necessary to lay cloth or boards on to protect against heavy rains and frost.

The soil, when the seed is sown, should neither be too wet nor too dry; the Seed-bed must be kept damp but not wet, and is better to be a little higher on the north than on the south, to insure drainage.

It is absolutely necessary that the bed does not get dry; it must be sprinkled every day, and, if necessary, twice a day. The most critical time is when the plants are beginning to show. Keep the beds covered with muslin cloth from ten a. m. to four p. m., unless there is likely to be frost or heavy rain, then it will be found necessary to cover with boards, also. We wish to impress upon the minds of those who intend raising tobacco, that the Seed-bed will require careful attention; as neglect in exposing the seed bud to very hot sunshine for one hour may prevent the seeds from germinating; there is also constant danger from allowing the bed to get too dry after the plants come up.

If it is shown, by small holes in the leaves, that bugs are working in the plants, a simple remedy is found in unleached wood ashes; sprinkle the bed in the morning while there is dew, and, if necessary, give the plants another sprinkle of ashes in a few days; and also give the bed a little more sunshine.

The Seed-bed should be kept free from weeds; the weeding should

begin as soon as the weeds are large enough to pull. This is a laborious process, especially when the seed-bed has not previously received the attention requisite for destroying the seed of weeds in the soil. The weeding should not be slighted, but attended to throughly, as often as necessary.

Should the foregoing directions be carefully followed, the plants will be ready for transplanting in from six to eight weeks after sowing.

PREPARATION OF SOIL

The land intended for the tobacco plants should be put in condition in time to be ready for the transplanting; in this part of the state, the ground ought to be well plowed, although not necessarily deep; after being plowed, it should be well harrowed and the soil made fine and as nearly level as possible, as irrigation will have to be followed, the ground can be marked crosswise, to the way it is to be irrigated.

Lay off the furrows three and one half fret, with a small plow; next mark off the water furrows the same distance apart, which will make the hills three and one half feet each way. When plants are ready to transplant, wet the water furrows thoroughly.

Where the furrows cross each other, small hills should be made with the hoe, the top flatted down, indicating the place where the plants are to be set, taking care not to raise the hills above the ordinary level. There are other methods of preparing the ground, but we only give the method we ourselves have followed, leaving others to follow better ways than ours if they know of such. The most of the work may be done in time, so that there will be no hurrying to get ready for transplanting, only the wetting of the furrows, and making the hills being left to the last.

TRANSPLANTING

The tobacco crop requires from four to five months' growth, from the time the seed is sown until the time for cutting, and nearly half of this time, is confined to the seed-bed; hence the necessity of much care to secure the best possible condition of the plants at the time of transplanting.

The best size for setting is when the leaves are from an inch and a half, to two inches in length, or something like the size of a silver dollar. The plant bed, several hours before being ready to transplant, should be well watered to allow the young plants to be easily drawn out, they may be pulled by taking hold and gently doubling up the several large leaves of the plant at once. Should they not come up easily, then, if necessary, use a knife or fork.

No careless person should be allowed to perform this work, for much injury to the crop might result from mutilating the plants in any way.

The practice of crowding a large number of plants into a basket, to be taken to the field, is a poor one; resulting in the bruising and breaking of the roots and leaves. The young plants should be kept straight, after being taken from the Seed-bed, with their roots together, and placed in shallow boxes, or pans, to be taken to the fields; and not a sufficient number placed together to admit of crushing, keeping what little soil that adheres to their roots from being loosened. They should also be protected from the hot sun, on the way to the field. Many plants will sometimes become wilted before setting, through carelessness in this respect. One person should drop the plants ahead in the row, one plant to each hill, and the setter follow; in setting, the plant should be taken in the right hand and a hole made in the center of the hill with the left forefinger for the roots, and should be deep enough to take them in, without bending, to the same level they occupied in the Seed-bed. The earth should then be pressed firmly around the roots with both hands; the pressure should be sufficient to close the hole in the soil at the bottom as well as at the top.

Care should be used not to get the plants too deep, or press the bud of unopened leaves, in making the soil compact. They should, however, be well covered and have a sufficient depth of soil.

It is also a good plan to set an extra plant about every rod or two, which may be used to fill vacancies that will be found in the after cultivation; such plants may be taken up, with a small quantity of soil attached to the roots, and reset without injury. As the Cut Worm will destroy some of the young plants, and others will wither, the ground should be carefully examined and reset, every few days, until a good stand is secured. It is important that the setting of the plants should be well done.

When a hot sun succeeds the transplanting, shading the plants with a handful of grass, or straw, for a few days, will prevent them wilting as badly, as they otherwise might. The reason for using grass or straw, is, that it soon dries up, and the winds will remove it from the settings, saving the trouble of removing by hand.

In field culture, where irrigating will have to be done, it wlll be necessary to run the cultivator both ways, to bring the ground to a level, which should then be furrowed on both sides of the plants. In a week after setting, the water should be turned on, giving them a light watering; as soon thereafter as possible, the first cultivation should be given, which generally consists of a very light stirring of the soil, with a hand hoe, simply breaking the crust that has formed and killing the weeds. It is important, that the soil, at all stages, be kept free from weeds. Tobacco is a sensitive plant, and will not grow well in connection with anything else, weeds or grass near the roots, although of small size, will effect the weight and growth to an almost incredible degree. Neither will it attain perfection if crowded, or shaded in anyway. It must have the soil all to itself; and a hot sun, which it is sure to have in this climate.

As quick growth is essential in order to produce a good quality of leaf, the aim should be to push the growth of the young plants as much as possible after they have been started in the field. Next to a fertile soil, nothing will secure this result so effectually, as frequent cultivation, and irrigation at least each week for the first four weeks after setting, increasing the water at each successive irrigation.

The cultivator should be used frequently in order to keep the soil

clean and mellow, being careful not to disturb the roots, using the hand hoe near the plants. When the leaves become large they are easily broken, and only the hoe should be used. It will be well to mention in connection with the foregoing, that the rows to be irrigated should not be too long, as the irrigating stream is liable to damage the plants nearest the ditch; the better way is to have short rows and cross ditches.

In the months of May and June there is often chilly, cold winds, and some cloudy weather, which gives the cut worm the opportunity to get in its work; if not attended to, many plants will be destroyed; their presence can easily be determined by going among the plants early in the morning and noting whether there are any small heaps of fresh earth or small round holes near the hills. If these are found, they are a sure indication of the presence of the enemy.

When plants are found with a portion, or all, of their leaves gone, it is another sure indication of the cut worm's presence. Should the weather be clear, and the sun hot, stirring the soil around the plant will make them go deeper into the ground as they cannot stand a loose soil or a hot sun. Ashes in the hill will sometimes destroy these pests, but they are difficult to eradicate. It will often pay to search for them in the hill, and kill them, when they are very troublesome. Plants that have been destroyed, should be replaced, and the hill searched for the worms.

When the plants are about half grown, the tobacco worm is hatched from an egg deposited by a moth. The egg is generally laid upon the under side of the leaf, and when first hatched—which is in about six days—the worm is so small that it would scarcely be noticed by one unfamiliar with its habits. It grows very rapidly, and proves one of the most destructive of enemies. It begins to eat the leaf on the under side, and is not at first easily detected. A small hole through the leaf is the first indication of its depredations. They increase in size so rapidly, and are so destructive, that if left unmolested for a few days the entire leaf would be destroyed. When full grown, the worm will eat nearly an entire leaf of large size in a single day. Their size and length at this period is nearly that of the forefinger of a man. There are two sets, or broods, of these worms during the season, the first appearing when the plants are about half grown, and the other when the tobacco is almost ripe. It is particu-

larly important that the first brood be destroyed for if they are not they become transformed into the moths which lay the eggs for the second brood, each moth laying about two hundred eggs. Unless the worms that feed upon the leaves of the tobacco are destroyed, the crop will be liable to be lost, or at least rendered so worthless as not to pay for the labor bestowed on its cultivation. The surest remedy is hand picking, and this must be sufficiently frequent to prevent injury to the leaves. The field should be gone over every few days, if possible, during the period of worming, as many will escape notice, and the eggs will continue to hatch; by a careful examination of the under side of the leaves, the eggs may often be seen and destroyed before the worms are hatched. They are about the size of a mustard seed, of a light greenish cast and seem transparent.

TOPPING

This consists in breaking off the tops of the stalks of tobacco, and is done in order to increase the size and value of the lower leaves, also prevent the plant from seeding, and to hasten its maturity. The best time for doing this is generally considered to be just before the bloom buds open, or rather, just as soon as the blossom bud at the top of the stalk is formed

When there has been a partial failure of the first setting of plants, rendering the growth uneven, it will be necessary to go over the fields twice for this purpose, topping at first only the earliest plants, and the remainder, a few days later. It is, however, desirable to top all the plants at the same time if possible, in order to secure uniformity in the maturity of the crop. The condition of the plant will indicate how great a length of the stalk is to be removed in this process. The general rule is to take off all the leaves that are less than six inches in length, or just above the last well developed leaf. Some are in favor of priming, and others are against it. Priming consists of removing the first, or lower leaves of the stalk. Those in favor of priming contend that the lower leaves harbor worms, making the worming process more laborious, requiring so much

stooping, while the saving of those leaves is often a sufficient temptation to the producer to prepare them for sale, where they add to the worthless product which is cumbering the markets. Another advantage of priming that is presented, is that the removal of the lower leaves permits additional nourishment to be supplied to the other leaves, and admits of a better circulation of air, with additional light and heat, which are so essential to plant life.

The ground leaves, we think, ought to be removed, as they are very inferior in everything that goes to make a good tobacco leaf.

Those plants that are intended for seed, should never be topped, but be permitted to blossom and ripen their seed. Before the time for topping, there will generally be found plants, that have shown a more vigorous growth, or other evidences of superiority. If the seed has been brought from a distance, or imported, some plants will show a more perfect adaptation to the soil, than the bulk of the crop. Accidentally, by such means, hybridizing new varieties, which better culture may produce, and the different kinds improved, forming new types, the same as with other plants,

In this climate, there is every opportunity for the seed to fully mature. Seed tops should be cut six or eight inches long, and hung in the curing house to get thoroughly dry, when they are rubbed out, and passed through a sieve to clean them from the chaff, after which they can be put away in paper, or cloth bags, until needed.

SUCKERING

A few days after topping, the suckers, or young shoots, will start out from the base of each leaf, those at the top making their appearance first, then downwards in succession. These should be broken off close to the stalk, as soon as they are at least two, or three inches long, being careful that no short ends be left in breaking, as they will be liable to tear the leaves in subsequent handling; as the leaves are daily growing brittle, and are liable to be broken off.

Turn to their natural position, all leaves turned up by the wind, or the sun shining upon the under side of the leaf, will soon burn it, and very seriously injure the color. In about ten days after suckering, the crop will generally be ready to cut; just before cutting, however, the suckers should all be broken from the stalk again, as they will grow very fast.

The worms should also all be removed, none being allowed to remain in the plants when harvested. Some varieties of tobacco will send out suckers faster than others.

CUTTING

Tobacco should be cut when fully matured. If left to stand beyond this period, and over-ripen, the leaf will not, when cured, be so soft and silky, and hence not so well adapted for wrappers. It will give a somewhat heavier product, but the weight will be gained at the expense of the quality. The time for cutting is determined by the appearance of the leaf, which changes its color to a somewhat yellowish cast, and becomes slightly spotted or marbled, especially when looked at towards the light. Sometimes this appearance seems a faint mottling of the leaves, with spots of a lighter green. As a general rule, it will be ready to cut in about ten or twelve days after topping, according to the weather. Another indication of ripeness is in the feeling of the leaves, which will seem thicker than they did a few days before, and will crack when folded and lightly pressed between the thumb and finger; the leaves will also become rustling and stiff.

When is tobacco ripe? is a simple question to ask, and could be answered by saying when it has arrived at, or attained to perfection; but the difficulty is to know certainly when that is and to understand the foregoing indications. To a novice, this is a difficulty question, and will remain one until he has seen a plant of ripe tobacco. The experienced eye is the only sure guide. It is almost impossible to describe with absolute accuracy any particular sign. These are other signs accompanying this period which have reference to the general apperance of the plant, but

with a little judgment and discrimination, the following general rule will be found to answer. All things being favorable, tobacco can be topped in six or seven weeks after transplanting, and may be cut in as many weeks after topping as there are leaves left on the stalk.

Over-ripening deteriorates from the quality of the crop; therefore, it is best to commence harvesting as soon as the signs of ripeness appear, as the last of the crop that is cut will be liable to become too ripe when left later, if a large crop is to be gathered, since it ripens very fast. The juices in the stalk and stems of that first cut will perfect the ripening process.

The best implement for cutting is a small pruning saw, although various tools are used for the purpose. In cutting, the plants should be held with the left hand, and the stalk cut about two inches from the ground. Some prefer to split the stalks with a knife from the top to within a few inches of the ground, to facilitate hanging in the sticks; but our own experience consider the this way of hanging objectional, for the reason that in dividing the stalk, the juices in it are dried up, and the leaves get no benefit from the lost juices, which, if the stalk is left whole, will gradually go into the leaves during the process of curing, making them of better quality.

After they are cut they should be left for an hour or two to wilt before being carried from the field, as the leaves will be less liable to become bruised, or torn by subsequent handling. Tobacco should not be cut when wet, with dew, or rain, or in the middle of a very hot day. Care must be taken not to let it remain in the field long enough after cutting to become sunburnt. If any remains cut in the field during the night, it should be laid in heaps of a dozen or more plants in a place; if tobacco is thus left in piles more than twelve or fourteen hours, there is danger of heating. As soon as the plants are sufficiently wilted after being cut, so that the leaves will not be easily broken by the handling, they should be taken to the tobacco house, or barn, and hung up to cure.

If the crop has been cut at the proper time, a second crop will soon begin to grow from the first roots. The same process will have to be again gone over, as with the first, the only difference being that the second crop should not be permitted to grow so tall, consequently there will not be so many leaves left as in the first crop; it will have to mature

in time to be got out of the way of high winds, that usually commence in October in some sections; it is better to top low, leaving from six to eight leaves to each stalk. Worming will have to be attended to, also priming; and they should be irrigated about every two weeks, using the hoe and cultivator as in the first.

HANGING

There are many ways of hanging the tobacco in the curing house. The plan we have used has been found to answer the purpose, as well as more expensive methods: Take strips of boards, four inches wide by one inch thick, of a length to cross the curing house; let ends rest on strips nailed to sides or ends of building; then have two or more cross beams to support the strips that the tobacco is to hang on; take bailing wire and cut in lengths of about ten inches, then with a round scratch awl bore through thick end of stalk, pass wire through it and bend hook at both ends; one hook to hang on four inch strip, the other to hold the tobacco plant. One hand can do the work on the floor, while another, on a step-ladder, can hang the plants. It is best when hung up at first to allow a little room between the plants, but as they cure, they will stand crowding together. Tier after tier can be thus hung to cure at little expense. Another method of curing tobacco is to hang the plants on a lath, on which they are put by means of a large needle, made with a socket at one end in order to fit the end of a lath; the needle, after being fastened to the end of the lath, is pushed through the lower part of the stalk, and is thus forced through; from six to ten plants can be put upon a common lath in this manner, according to their size. The laths upon which the plants have been strung are put into a wagon arranged for the purpose; some are particular to have each end of the laths supported, that the plants may hang down without being broken or crushed; this requires more labor, as a smaller quantity can be carried at a time; but the plants are less liable to injury by these means. The laths are placed upon slats or cross beams arranged for the purpose in the tobacco house, or barn, where the plants are

suspended for drying. When large quantites of tobacco are produced, a tobacco house will be found indispensible. Such a building has beams and joists in several tiers, arranged to support the laths or poles, on which the plants are hung. About one half the boards of such a building are hung on hinges so that they can be opened like a door, in order to better admit the light and air. Where the light and air are thus admitted, the laths can be placed nearer together than where the circulation is less free; about ten or twelve inches apart is the usual distance for placing the laths from which the plants are suspended. After hanging the plants for curing, the doors should be kept open in pleasant weather, to admit the air and light, which are so essential in perfecting the process of curing. On damp, foggy nights the building should be kept closed to exclude the dampness, and after the curing process is completed the building should be closed constantly. When tobacco dries rapidly, the tendency will be to produce a light color; when it dries slowly, the tendency will be in the opposite direction. The great difficulty in curing tobacco is to so govern the ventilation as to secure slow drying and obviate what is termed "pole-burning," or "pole-sweating."

In very dry, windy weather, the plants might dry too rapidly if the means of ventilating were all employed, and it may sometimes be found desirable in such weather to keep the doors closed entirely, for whole days together.

The judgment of the person having charge of the crop at this stage, will be called into requisition, the treatment given depending upon the condition of the tobacco at the time. It is the nature of the plant. irrespective of weather, to begin to sweat a little a few days after being hung up, the moisture standing in drops on the stems and leaves. When this moisture drys off well there is little danger from pole-burning. At this period there should be a free circulation of drying air through the plants.

Pole-burning is most liable to occur during the first three weeks after the tobacco is cut; if the air is then heavy and damp with moisture, the plants will not dry off well, but will ferment or "burn." The best method is to exclude the dampness in wet or foggy weather and admit the dry air in clear weather, taking care not to crowd the plants in hanging. The leaves should also be well shaken out, so as not to cling to the stems.

Fully ripe tobacco is less liable to pole-burn, than that which is cut greener, but such tobacco is considered less desirable for wrappers.

In all the process of curing, great care should be observed not to bruise or tear the leaves or break them off the stalk.

There are other methods of curing practiced in some sections, such as sun curing, open fire curing, flue curing, etc., but we consider the processes already described to be as good as any practiced.

STRIPPING

During the winter, after the tobacco is properly cured, which is the period when the leaf stem will yield no juice by wringing, although still pliable and damp. When it sets in for a drizzling, wet, foggy spell of weather, the door or doors of the building, must be opened to allow the damp atmosphere to pervade the whole interior. After the leaves have become damp enough to allow of handling without breaking, the plants must be taken down from their hangings and laid in heaps in order to keep damp; the leaves are then stripped from the stalk, one at a time, taking care not to tear them, and keeping each one straight. If found to be drying out, further evaporation may be prevented by covering the heaps with damp straw or hay. Tobacco is usually stripped in two qualities, ground leaves, or fillers, and wrappers.

The leaves that are next to the ground usually from two to four are more or less damaged, consequently command a much lower price than the wrappers. The ground leaves, if they have been left on the stalk, should be taken off first, and tied up in separate hands. About twenty leaves will make a good hand, twelve to fourteen leaves of wrappers; the tying should be done neatly, so that the hand, when finished, will look neat and workman-like; small, pliable, leaves should be selected for this purpose. It is unquestionably to the grower's interest to put his crop in the best possible shape, and to handle it in the most systematic and painstaking manner; for this reason it will pay to be particular in assorting the tobacco. To perform the work of assorting correctly requires some

experience. No article can be written upon the subject which will make a person who never performed the work to do it properly.

Tobacco is generally packed in boxes, the usual size being three and a half to four feet long, two and a half feet wide, and two and a half feet deep.

It should be packed quite closely, the man who does it being in the box and pressing it down with his knees; when the box is even full, the contents can be crowded still more compactly by means of a lever and follower that will just fit the inside of the box, after which more tobacco can be put in. Close packing prevents undue drying, thus maintaining the desirable degree of moisture for handling.

When packed as full as the box will permit, the top should be nailed in firmly. About three hundred pounds can be packed in a box of the above description.

We have endeavored in these pages to give a clear explanation of the process of growing tobacco, from the seed-bed to the packing box, using only the best methods we are acquainted with. We believe that those who have raised tobacco in other siates and have failed here, will be able to learn wherein they have failed by a careful study of what has been written. As it would be impossible to follow each individual case, we have thought it more expedient that our explanation of the different processes be carefully compared with the methods that have been tried, and we are confident that the cause of failure will be easily discovered.

While the general features of tobacco culture will be the same here as in the old tobacco states, and with which general methods many are well acquainted, yet there are technical points which, on close examination, will be seen to have been the cause of discouragement and often failure.

As an illustration of the difference in the management of the seed-bed in the east and in this state, the ordinary practice was to find a protected spot, if possible in the woods original growth, burn a pile of brush and leaves on the bed before sowing the seed, and when the bed was completed cover with some light brush as a protection against roving stock, no further attention being required until the plants were ready to be transplanted. Here the seed-bed has to be managed quite differently, in

fact, the utmost care must be taken with the seed-bed, even more so than with the other details of the crop.

While the tobacco crop requires diligent care from beginning to end, it especially requires the closest care in the seed-bed, a failure to attend to the sprinkling, and keeping the bed moist, or too much hot sun, will ruin the chance for a supply of plants for the season.

It will be plainly understood, that while the ordinary methods of the seed-bed are the same here as in the East, the climate here causesus to expend much more care and time to bring the plant to the period of transplanting. As much depends on the success of getting the young plants to the proper stage, we would impress the importance of having the seed-bed prepared and sown at the proper time. In this climate seed could be sown any month in the year, and the plants might grow, but there would be too much risk.

The seed-bed should be made, in the different localities, in ample time so that the plants can be transplanted as soon as possible, after all danger from frost.

Frost has been known, in some sections, as late as the middle of May, enough to injure young plants. February and March will be found to be the best for the purpose; the ealier the better, when the conditions will permit.

Inexperienced cultivators of tobacco will, we trust, find many hints in what has been written to make their work much more satisfactory and simple, to those having a taste for the work, there is no plant that is more interesting, or will so well repay the care and time expended upon it.

To the novice who contemplates entering the field of tobacco culture, we would say, that success in the growing of tobacco, like other crops, requires pre-emiently good judgment and continued watchfulness; but there are few crops, considering the time they are making, that will bring more substantial returns.

We would suggest to those having young orchards of either citrus or deciduous fruits, that good crops of tobacco could be grown between the trees, without in any way interfering with the growth of the trees; by the application of barn yard manure, or other fertilizers, a paying crop could be grown for several years, or until the trees should require all the room.

We have no doubt there are many who are puzzeled to know how to secure an income until their trees become bearing, we know of nothing that will repay them better than the crop here indicated. We have grown tobacco between orange trees six years old with success.

Messrs. B. M. Blythe and Geo. Spiker of Downey, Los Angeles County are now engaged in the manufacture of cigars, using tobacco grown at Downey. They are turning out the very best quaility of cigars; deemed by experts to be equal, if not superior to the many, so-called imported "Havana's."

These gentlemen have also a patent process for curing tobacco, which is known as the "Spiker Process," and is covered by Letters Patent. We visited their factory during the month of February, and were very much interested, to observe the enthusiasm, all hands felt in the development of an industry, that is destined to give "Downey" a name, that may, in time, become famous as the Pioneer locality for tobacco growing and manufacturing city of Southern California.

The Brands of cigars they are turning out will be known as the "Downey Perfectos," "The Santa Gertrudes," the "La Alegria" and "The Ideal."

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